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December 1, 1951

SCIENCE NEWS LETTER

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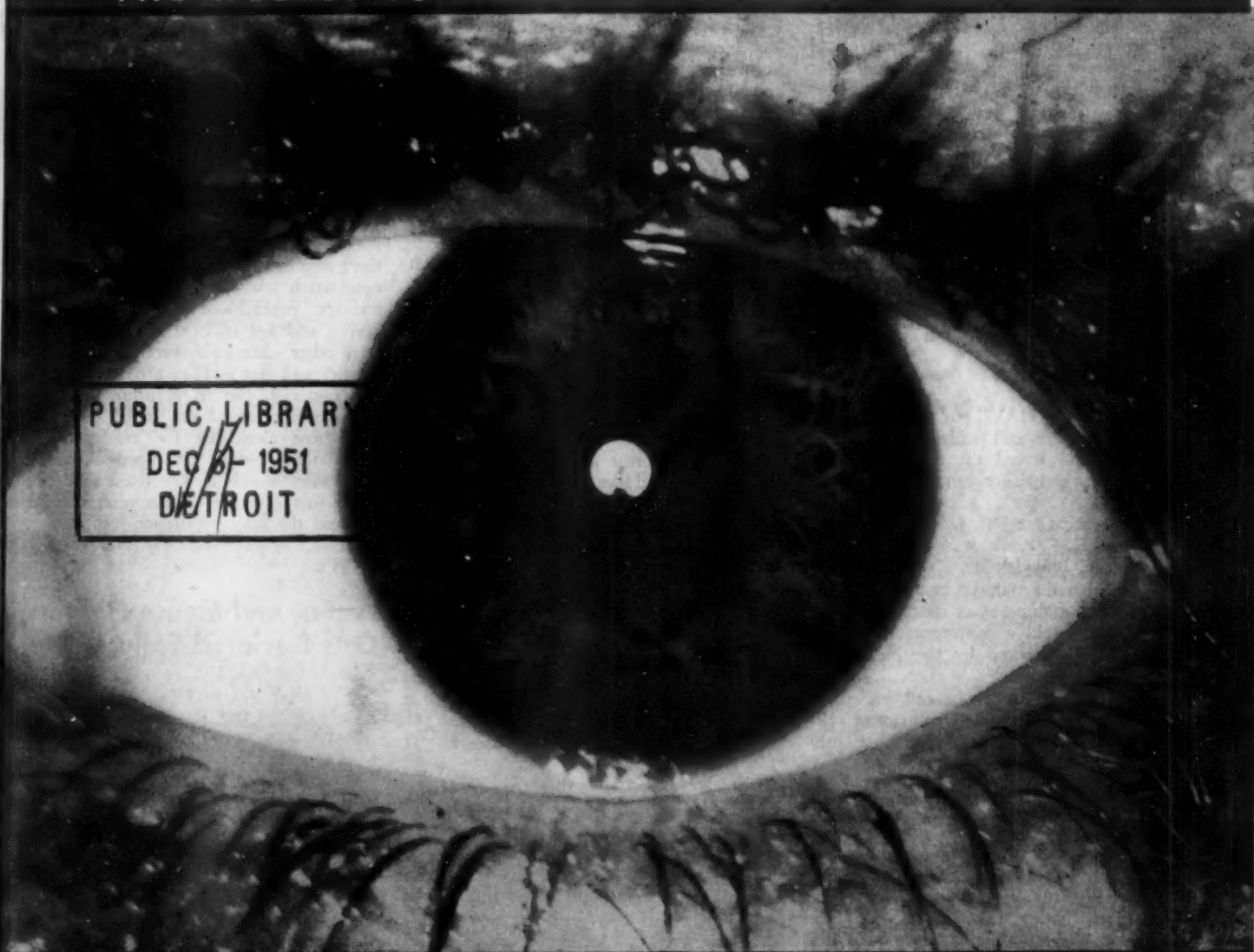
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BIOCHEMISTRY

Antidote to Beryllium

Discovery of "first successful antidote" to beryllium poisoning reported. Chemical, aurin tricarboxylic acid, fixes the metal, making it inactive.

► DISCOVERY OF "the first successful antidote" to beryllium poisoning has been announced by Drs. Jack Schubert, Marcia R. White, Asher J. Finkel and Arthur Lindenbaum of the Argonne National Laboratory, Chicago.

Beryllium poisoning might be called an atomic age disease. The light weight, durable metal, beryllium, was formerly used in fluorescent lamps. It was abandoned for this use when its poisonous quality was learned. Now it is under investigation as a construction material for atomic piles.

The antidote discovered at the Argonne Laboratory is a chemical called aurin tricarboxylic acid, or ATA for short. It reacts with beryllium salts to form a red compound. The reaction is the same kind as that by which a metallic salt fixes a dye to cloth.

By fixing the beryllium, turning it into an inactive, non-poisonous compound, ATA prevents the metal from exerting its poisonous action on the body.

Poisoning from beryllium comes from the presence of small amounts of the metal or its compounds in the body. Inhaling beryllium causes widespread damage in the lungs. No successful cure for the poisoning is known at present, although the hormone chemical, ACTH, has brought marked temporary improvement in many patients.

Experiments in which ATA proved a "nearly perfect" antidote for otherwise fatal doses of beryllium compounds in laboratory animals were reported by Dr. Schubert and associates to the American Chemical Society meeting in Chicago.

Science News Letter, December 1, 1951

MEDICINE

Site of Cancer Spotted

► SCIENTISTS HAVE put a finger on the spot in a tumor cell which can make it cancerous and traced the route by which the cancer potentiality can spread to normal cells.

The scientists are Drs. J. Stasney, A. Cantarow and K. E. Paschkis of Jefferson Medical College, Philadelphia.

The chromatin material in the tumor cell is where the malignant, or cancer, potentiality lies, they told a conference on viruses and cancer sponsored by the New York Academy of Sciences.

Chromatin is part of the cell nucleus. It is present in normal as well as cancer cells, and is the carrier of the genes in inheritance.

Chemically, it is a desoxyribose nucleic acid attached to a protein structure base.

Chromatin forms a network of nuclear fibrils, or thread-like structures within the cell. The Philadelphia scientists believe that it is by the entrance of these chromatin threads or some component of them into normal cells from tumor cells that the malignant potentiality of the chromatin of the tumor cell is spread.

This spotting of the cancer potentiality part of tumor cells was done in experiments in which the chromatin and other fractions of rat cancer cells were extracted and then injected under the skin of other rats.

Science News Letter, December 1, 1951

PLANT PATHOLOGY

Virus Epidemic in Barley

► A NEW virus disease of oats, wheat and particularly barley hit California's crop in epidemic proportions this year, two University of California scientists in Davis report.

Department of Agriculture officials in Washington state that to keep the deadly disease from spreading, all work on infected plants will be done within California.

The disease, "widespread and destructive," is known as yellow-dwarf, a name that closely describes the symptoms on barley—a brilliant yellowing of the leaves accom-

panied by moderate to severe stunting of the plants.

As far as is now known, the disease is caused by a virus that is transmitted by four different species of grain-infesting aphids. Other aphids that spread the disease may be found, Drs. John W. Oswald and Byron R. Houston of the University's division of plant pathology predict.

Although the disease is not new in California, this is the first year that it has been so destructive. The plant pathologists think that the abnormally large population of

aphids on grain crops during 1950 is responsible. Aphids, abundant last March, when barley and other cereals were for the most part very young, made the damage from the disease more acute, they believe. The scientists are now looking for the plant that serves as host to the disease-spreading aphids during the summer and early fall, they state in *PLANT DISEASE REPORTER* (Nov. 15).

Science News Letter, December 1, 1951

PUBLIC HEALTH

Disease-Spreading Snails in Japan Successfully Fought

► SUCCESS OF "Operation Santobrite" in Japan to eradicate disease-carrying snails was reported at the joint meeting of the National Malaria Society, the American Society of Tropical Medicine, and the American Society of Parasitologists in Chicago.

The operation was carried out by the following six-man team of American Army and civilian scientists and Japanese scientists: Col. George W. Hunter III, L. S. Ritchie, Capt. R. Freytag, C. Pan, M. Yokogawa, and Sgt. D. E. Potts.

"Operation Santobrite" got its name from the name of the chemical used in the snail-eradication trials. Chemically, Santobrite is sodium pentachlorothionate. During the spring and fall of 1950 and 1951 this and two other chemicals were put along the ditches and rice paddies around the village of Nagatoishi-cho in Kyushu, Japan.

Santobrite turned out to be the best of the three chemicals for eradicating the snails that spread the blood flukes that cause schistosomiasis. The latest snail count, made in the spring of this year, showed it reduced the snail population 99.5%.

Science News Letter, December 1, 1951

MAMMALOGY

As Rat and Mouse Fighters, Cats Declared Failure

► TO GET rid of rats or mice in your house, do not rely on a cat. Most city cats live by feeding on garbage or on table scraps.

Rodents are a "small item" in a cat's diet, Dr. William B. Jackson of Johns Hopkins University's School of Hygiene and Public Health, Baltimore, has found from surveying the food of cats in two residential areas of Baltimore. Perhaps the cats would eat more rats if there were less garbage around, but further studies would be needed to prove this.

In the city blocks studied, cats ate about 20% of the rats that must die during the year to keep the number of rats from increasing, he estimates. This does not mean, however, that these rats would not die from other causes if the cats were not present. Dr. Jackson's observations on what cats eat appear in the *JOURNAL OF MAMMALOGY* (Nov.).

Science News Letter, December 1, 1951

PHYSICS

Need All-Pervading Ether

Nobel physicist Dirac concludes that "with the new theory of electrodynamics we are rather forced to have an ether." Idea was abandoned after Einstein's relativity in 1905.

► WE MUST have an ether, after all.

The idea of a universal and all-pervading fluid was abandoned shortly after Einstein's discovery in 1905 of the principle of relativity, into which an ether could not be fitted.

Now a Nobel physicist who has done much to build the theoretical world of physics as we know it, Dr. P. A. M. Dirac of St. John's College, Cambridge University, England, as the result of his new theory of electrodynamics, concludes that "with the new theory of electrodynamics we are rather forced to have an ether." The new Dirac electrodynamics theory has not yet been published but the Royal Society has it in press.

This rejuvenation of the ether is sure to stir great interest. The theory is set forth in a letter to the British journal, *NATURE* (Nov. 24).

Dr. Dirac has applied quantum mechanics, the mathematical concept of physics that won for him the 1933 Nobel prize, to the ether.

In the last century the ether seemed necessary to explain how light and electromagnetic radiation operated. It was supposed to be in perfect vacuum everywhere. The ether at each point in empty space was

supposed to have a velocity less than that of light and the directional effect should have been detected by experiment. Relativity contradicted this, since all directions were required to be equivalent.

Now Dr. Dirac explains that the velocity of the ether, like other physical variables in the new physics, is subject to uncertainty relations. It is possible to set up what is called a wave function which makes all values for the velocity of the ether equally probable. This could represent the perfect vacuum that would fit into relativity.

"We may very well have an ether, subject to quantum mechanics and conforming to relativity, provided we are willing to consider the perfect vacuum as an idealized state, not attainable in practice," Dr. Dirac declares. "From the experimental point of view, there does not seem to be any objection to this. We must make some profound alterations in our theoretical ideas of the vacuum. It is no longer a trivial state, but needs elaborate mathematics for its description."

Dr. Dirac's new electrodynamics theory derives a velocity with which any electric charge must flow. In regions where there is no charge it is the velocity with which

a small charge would have to flow if it were introduced.

This velocity which is the same at all points in space-time plays a fundamental part in electrodynamics, that is, almost the whole physical world around us. Since it is natural to consider this the velocity of some physical thing, the ether, long abandoned, is now reborn.

Science News Letter, December 1, 1951

MEDICINE

Medicine to Double In Next Ten Years

► TWICE AS much medicine will be swallowed in the next 10 years as in the past 10, it appears from a prediction by Harry J. Loynd, president of Parke, Davis and Company, pharmaceutical firm in Detroit.

New products have been largely responsible for the growth of the pharmaceutical industry which doubled its sales in the past 10 years, Mr. Loynd stated.

Results of present and future research on life-saving, health-preserving medicines will double the amount of sales again in the next decade, Mr. Loynd predicts.

Science News Letter, December 1, 1951

PHYSIOLOGY

Device Ends Pilot's Oxygen Lack Worries

► A DEVICE to end a pilot's worries about lack of oxygen has been developed by Dr. Kurt Kramer, physiologist at the U. S. Air Force School of Aviation Medicine, Randolph Field, San Antonio, Tex.

The pilot wears a tiny, earring-like device attached to either ear. Using the tiny button, connected by wire to the plane's instrument panel, he will be warned promptly when his oxygen supply is leaking or if his hose has become disconnected.

Operating on an electric eye principle, the warning device uses the ear lobe as a light filter. It is activated by the slightest change in the oxygen content of the blood, since blood lacking in oxygen changes to dark red. Ordinarily it is difficult or impossible to detect such an oxygen lack.

The photoelectric eye detects the blood's color change and instantly a red light flashes brightly on the instrument panel, warning the pilot of impending danger and of the possibility of passing out.

Dr. Kramer's invention may also prove useful outside the field of aviation. A doctor could thus control the amount of oxygen given to patients, the warning red flash telling him that artificial respiration is necessary. It may even be a boon for those suffering from respiratory paralysis, particularly polio, the German-born doctor states.

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OXYGEN-LACK WARNER—When this earring-like device, known as a photoelectric hypoxia warner, is attached to a pilot's ear and connected to the instrument panel via his helmet, he will be warned by a red flashing light if not enough oxygen is coming through his mask.

ENTOMOLOGY

Better Pest Control

► THE ANSWER to a farmer's most fantastic dream, plants that kill their own insect pests, now appears within the realm of possibility.

This dream lies in new systemic insecticides, phosphorus compounds developed in Germany, which are used not on the outside of the plant but inside it.

Fed to the plant by spraying the leaves, through irrigation water or by direct injection into the trunk, these new compounds become part of the plant system. Sap carries the insecticide even to new growth, and aphids and mites sucking on it are poisoned.

Moreover, it doesn't kill "friendly" insects—the bees that pollinize the plants or the ladybirds and others that prey on pests. The remarkable systemics just kill the insects feeding on the plant.

The phosphorus compound systemics have set off studies involving almost a world-wide team of research scientists, even the Atomic Energy Commission. While the study is only begun, Dr. R. L. Metcalf, chairman of the division of entomology at the University of California's Citrus Experiment Station at Riverside, believes the outlook is more hopeful than for any other chemical pest control in sight.

Some 500 phosphorus compounds are being tested by the Citrus Experiment Station, many of them from the laboratory of Dr. Gerhard Schrader of the Bayer Co., in West Germany, once a unit of the huge I. G. Farben chemical industries combine.

Ironically, these compounds which may become one of man's great chemical benefactors stem directly from World War II research into the deadly phosphorus compound "nerve" gases. Their effect on enzymes essential to the nervous systems of insects makes them effective controls.

The scientists see hope in the systemics for possible control of the aphid-spread quick decline virus in California orange groves. They even dream of developing systemics which might be administered to domestic animals to protect them from lice, mites, ticks or biting flies.

Science News Letter, December 1, 1951

TECHNOLOGY

Tar Spots in Cotton Fabric Are Resin from Cotton Plant

► THE WAY has now been opened for the elimination of "tar spot" blemishes in cotton fabric. These imperfections annually cost textile mills many hundreds of thousands of dollars.

It has always been a mystery where the "tar spots" come from. For years scientists in mill laboratories, colleges and research centers have been pushing toward a solution of the mystery.

Now, Dr. Jack Compton, technical director of the Institute of Textile Technology, Charlottesville, Va., reports that a discovery by Leo Hubbard, ITT research chemist, proves beyond doubt many of the "tar spots" come from tiny resin sacs of vegetable origin.

These sacs are normally present in leaves or burs which get mixed with cotton fibers during harvesting. These tiny egg-like capsules, about one-fiftieth of an inch in size, often are spun right into a piece of yarn and woven into the cloth.

When heated, they burst and a black substance resembling tar flows out to cause a smudge. Ordinary bleaching operations cannot remove the stain, because this resinous substance will not dissolve in petroleum solvents.

Until this new discovery by textile scientists, it was believed that all "tar spots" resulted from flecks of tar or asphalt picked up by cotton during its journey from the field to the spinning mills. Hence the common name, "tar spots."

Dr. Compton says that while some of the spots which plague the manufacturers and the customers alike are caused by asphaltic materials, a great many also come from the tiny resin sacs of vegetable origin. This discovery, he says, opens a new way toward eliminating the problem completely.

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Question Box

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What diet element has been found a key to fast healing of wounds? p. 343.

GENERAL SCIENCE

What questions may be used to differentiate a scientist from a crank? p. 349.

GEOLOGY

How many meteorite craters are now known? p. 346.

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MEDICINE

Of what may an illness like King George's warn? p. 343.

PUBLIC HEALTH

How have disease-spreading snails in Japan been fought successfully? p. 338.

TECHNOLOGY

In what way have usually destructive sparks been put to constructive work? p. 342.

What new process for grabbing nitrogen from air is in pilot plant stage? p. 344.



PRODUCTION-LINE PIGLETS—Instead of Mama Sow's milk, these one-week-old piglets drank Terralac from troughs built in poultry batteries in the laboratory of Chas. Pfizer & Co., and they thrived and grew on this man-made diet.

NUTRITION

Pigs Raised Like Chicks

Synthetic milk for pigs, with antibiotic terramycin, may make possible the raising of piglets on a mass production basis such as now used for chicks.

► "AND THIS little pig was raised on synthetic milk and grew and grew and grew."

This is the story of the motherless pigs who were happier (if getting fat faster is an index of pig happiness) than piglets who were fed by Mamma Sow in the old-fashioned suckling way.

A synthetic sow's milk has been made possible by use of the antibiotic, terramycin, Herbert G. Luther, of Chas. Pfizer & Co., Brooklyn, N. Y., reported to an animal nutrition seminar.

This new product forecasts the raising of piglets in converted chick brooders on a mass-production basis on the same scale as chick hatcheries. The little pigs would be taken away from the sow when two days old. Even the runt who loses out in competition for the sow's milk makes good progress on the growth-stimulating synthetic milk. When weaned from the synthetic milk diet, at eight weeks of age, the pigs are 10% to 35% heavier than sow-fed animals.

The mother pig, relieved of her family, can get into production again, with two and

a half to three litters a year instead of the customary one or two.

The ability of an antibiotic, or germ-fighting substance, to promote growth in some animals, notably pigs and poultry, was used in making the new synthetic sow's milk. The artificial milk is made of dry skim milk, lard, fish solubles, vitamins, and minerals, fortified with terramycin, which is one of the new wonder drugs now finding wide medical use. This stimulates growth and gives protection against disease.

In one test, a litter of 16 pigs, more than a sow could have handled, weighed some two tons at the age of five months.

Science News Letter, December 1, 1951

INVENTION

Magnetic Fluid Clutch—Force Transmitting Device

► THE SO-CALLED magnetic fluid clutch for the transmission of power, developed at the National Bureau of Standards some four years ago, has now been granted a

patent. This type of clutch, using oil containing fine particles of soft iron, is already in use in delicate instruments and experimentally in automobiles.

Patent 2,575,360 was issued to Jacob Rabinow of the National Bureau of Standards for this invention. Rights are assigned to the Secretary of the Army because the development was carried out at the Bureau under contract with the Army.

This type of clutch is electromagnetically controlled. Basically, it consists of two parallel disks of metals capable of being magnetized between which is oil containing iron particles. When the disks are magnetized the magnetic field set up between them magnetizes the iron particles, holding them in rigid position so that the oil and iron mixture locks the disks together.

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MEDICINE

First Crystal Virus From Growth on Animal

► FOR THE first time, a crystalline virus-like material has been obtained from an animal growth. The material was obtained from warts growing on human skin.

This material, consisting of spherical particles, is not only virus in nature but is responsible for the appearance and growth of the wart, Dr. Joseph L. Melnick of Yale University School of Medicine declared at the conference on viruses and cancer held under the auspices of the New York Academy of Sciences.

The crystals which apparently are the virus cause of warts were obtained in research by Dr. Melnick and Drs. Henry Bunting, William G. Banfield and Maurice J. Strauss, also of Yale School of Medicine.

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METEOROLOGY

Rain Detection by Radar More Difficult Than Hoped

► MEASURING RAINFALL and locating rainstorms with radar is turning out to be more difficult than hopeful weathermen thought.

David Atlas and Harold C. Banks, scientists at the Air Force Cambridge Research Laboratories, Cambridge, Mass., have discovered that three factors distort the picture of rain as seen on a radar's screen, or oscilloscope.

The three factors involved are: how reflective is the rain, how much loss in the reflected beam is there due to intervening storms, and how much loss is there because of the way the beam spreads as it gets farther and farther from the radar. The scientists presented analyses of these factors as they applied to several storms, in the JOURNAL OF METEOROLOGY (Oct.).

Science News Letter, December 1, 1951

PUBLIC HEALTH

Change Reportable Ills

Influenza and pneumonia come off list of diseases reported weekly to Public Health Service, but undulant fever, botulism, dengue fever and others added.

► INFLUENZA AND pneumonia are coming off the list of diseases to be reported weekly by states to the U. S. Public Health Service.

Botulism, brucellosis or undulant fever, and dengue fever are going on the list.

These and some other changes for making disease fighting more effective have now been approved by the U. S. Public Health Service and the State and Territorial Health Officers' Association.

Object of all disease reporting, of course, is to keep health authorities informed of what "catching" diseases are occurring, where they occur, and whether the number of cases is reaching epidemic proportions. With this knowledge, measures to stop epidemics and protect the public can be taken more effectively.

Cases of certain diseases must be reported when they occur, if they do, without waiting for the end of the week summary report. These are: cholera, plague, smallpox, epidemic, or European, typhus fever, and yellow fever.

Endemic typhus, spread by fleas instead of lice, and occurring in fair numbers of cases all along in parts of the United States, will be on the new list of reportable diseases. So will infectious and serum hepatitis, a

liver disease known to laymen as jaundice because this may be one symptom. Malaria, rabies in man and trichinosis, the measly pork disease, are on the new list.

Reports of infantile paralysis will be divided into reports of paralytic and non-paralytic cases. Paratyphoid fever will be reported separately from typhoid fever, under the name, salmonellosis. Bacillary dysentery will appear as Shigellosis. Tetanus and trachoma will be on the new list.

Because of the possibility of germ warfare, glanders, usually fatal disease which humans get from horses, will be on the list of diseases reported annually. Also on the annual, but not on the weekly, list will be leprosy and leptospirosis, or Weil's disease. Tuberculosis and venereal diseases go on the annual list.

Psittacosis, or parrot fever, and a new disease, Q fever, go on the weekly list.

Weekly and annual reporting of communicable diseases by state health officers to the U. S. Public Health Service is on a voluntary basis, the states cooperating for their own and each other's benefit. But whenever an epidemic of any disease breaks out, state health officers report that immediately to the U. S. Public Health Service.

Science News Letter, December 1, 1951

TECHNOLOGY

Shape Metals by Sparks

► SPARKS WHICH destroy have been put to constructive work. A new invention utilizes the same kind of sparks which destroy automobile distributor points and erode electrical switches for shaping metals which cannot be shaped by machinery.

The new method electronically controls the intensity and duration of the spark. The result is work with an accuracy as close as .0005 inch.

News of the invention appeared in Russian journals translated in this country in 1948. Simultaneously, it is claimed, it was independently invented in this country by Edmund E. Teubner, who then formed the Method X Corporation of Pittsburgh. Later, Method X was bought by the Firth Sterling Steel and Carbide Corporation, Pittsburgh.

In this new method, screw threads, round or shaped holes and other incisions in metals which cannot be made by machining can be made by the condensed spark discharge. A reverse picture of the tool is

made and the sparks jump between that and the metal which is to be formed.

Firth believes that it has advanced the method far beyond that described in the Russian journals. The process is expensive, it is said, but since the parts cannot otherwise be machined, the expense is justified. The process is reported in the Arthur D. Little, Inc., INDUSTRIAL BULLETIN (Oct.).

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MEDICINE

Bursitis of Elbow Curable by X-ray

► ABOUT 95% of patients with bursitis of the hip and of the elbow, generally called tennis elbow, can be cured by X-ray treatments, Dr. W. L. Waskow of Madison, Wis., reports.

Bursitis of the hip is quite common, he states in a report in the MISSISSIPPI VALLEY MEDICAL JOURNAL (Nov.). Many of the pa-

tients with this painful and disabling condition, however, think they have arthritis and do not even see a doctor because they fear no form of treatment will be very helpful. Even the doctor sometimes overlooks the fact that bursitis can attack the bursa of some joint other than the elbow. He may put the hip bursitis down to muscle soreness and prescribe diathermy or some form of heat treatment. Unfortunately, this makes the bursitis worse, Dr. Waskow states.

Tennis elbow commonly is precipitated by heavy work which the patient does not ordinarily perform. This type is usually easily recognized but the elbow bursitis that comes from injury may, like hip bursitis, be passed off at first as muscle soreness.

Dr. Waskow reports that of 60 cases of hip bursitis and 35 cases of tennis elbow, good results were obtained by one course of X-ray treatment in 85%. Another 10% got temporary relief but had to have a second course of X-ray treatment for permanent benefit. The other five per cent did not benefit from the first course of X-ray treatments and were not re-treated by X-rays.

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MEDICINE

Korean Veterans Are Less Malaria-Conscious

► KOREAN WAR veterans who get malaria are not as aware of their condition as World War II veterans. Consequently when they suffer relapses after they get home, they are not as likely to get treatment before mosquitoes get a chance to bite them. And the most important malaria-carrying mosquito in the United States is easily susceptible to infection by Korean vivax, or relapsing malaria.

These facts, pointing to the danger of malaria being spread from returning Korean veterans, were reported to the National Malaria Society in Chicago by Drs. Martin D. Young and Robert W. Burgess of the U. S. National Microbiological Institute.

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ANTHROPOLOGY

Basin Becomes Test Tube For Studying People

► THE PAPALOAPAN BASIN, 300 miles southeast of Mexico City, is serving as a "test tube" to study the reactions of a peaceful, primitive people suddenly thrown into a world of machines and technology.

So reports Dr. Ralph L. Beals, professor of anthropology at the University of California at Los Angeles, who recently returned from the area.

The Mazatec Indians, who occupy part of the Papaloapan Basin, are extremely primitive natives. They still practice many prehistoric ceremonies, such as sacrifices and dances to the gods.

BIOCHEMISTRY

Sulfur Aids Wound Healing

Fast healing of wounds on the battlefield, in accidents or in the operating room aided by sulfur proteins in the diet, doctors report.

► **SULFUR** IN the diet is the key to fast healing of wounds on the battlefield, in accidents or in the operating room. The sulfur is eaten in the form of protein building blocks known chemically as amino acids.

The key role of the sulfur-containing amino acids for wound healing was announced by Drs. Martin B. Williamson and H. J. Fromm of Loyola University School of Medicine in a report to the American Chemical Society meeting in Chicago.

Not all amino acids contain sulfur. Those that do are found in the proteins of eggs, milk, wheat, corn and some other foods, Dr. Williamson said.

Wounds heal at a much faster rate when the diet is high in protein than when it is low in protein. But when a sulfur-containing amino acid is added to the low protein diet, wounds in laboratory animals healed at almost the same rate of speed as those of animals on the high protein diet.

The importance of the sulfur amino acids was also shown by a study of the sulfur balance. During the healing of a wound, this study showed, the sulfur compounds accumulate in the body, whereas proteins in general are lost by excretion faster than they are gained through the diet.

"This suggests," Dr. Williamson said,

"that the tissue proteins are being broken down, but that the sulfur-containing amino acids of protein are being conserved for the healing wound. It appears that during the stress reaction after wounding, tissue protein is being sacrificed to make a greater proportion of sulfur amino acids available for some process connected with healing."

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ENGINEERING

Electronic Brains Figure Metal Cutting by Machine

► **ELECTRONIC "BRAINS"** may soon be helping machine tool cutters. The computer will do the necessary figuring, then its results will be fed by punched tape into a machine that does the cutting.

Such a development is foreseen from work being done at the Massachusetts Institute of Technology, Cambridge, to make machine tools more useful.

Under development is a contour-shaping machine with a cutting tool whose position is controlled by digital information rather than the dimensions of a model, as used in presently existing automatic machine tools. From design drawings of how a part should look, engineers figure out over what path a cutting tool would have to move in order to form the desired surface. This line-path is then divided into very small parts—0.0005 inch long.

The correct angle for the cutting tool to go during a certain time in order to make such a minute path is computed. Since figuring this involves a large amount of routine computation, electronic "brains" will probably be used.

Information computed by the machine will then be fed into the "machine director" which will move the cutting tool just a tiny space. The tool, therefore, can never be more than 0.0005 inch in error.

The machine director controls the angular position of three separate servomechanisms.

Once properly punched, the paper tape provides a permanent control and may be used again and again to make the same shape. The new machine is particularly suited to making airfoil surfaces. It is also expected to be applied to template making, cam making and jig boring machines, Dr. Gordon S. Brown and William Pease of MIT report in *THE TECHNOLOGY REVIEW* (Nov.).

Science News Letter, December 1, 1951

Not long ago the Mexican government began building roads, flood control projects and power dams on their land. Lakes backed up by the dams will soon force many of the Mazatecs to find new homes, while results of the modernization will give them cheap power, transportation and schools.

The 90,000 Mazatec Indians are beginning to react to this progress. Dr. Beals, together with U.C.L.A. graduate student, Elias Adis Castro, who is currently living with the Indians, are watching this reaction carefully in hopes of uncovering ways and means of easing the change.

"In the Mazatec situation we have a compact, test tube case," Dr. Beals said.

Science News Letter, December 1, 1951

MEDICINE

Blood Vessel Trouble May Warn of Lung Cancer

► **THROMBOPHLEBITIS**, blood vessel trouble similar to that which attacked King George VI of England, should, if it recurs, be considered a warning sign of hidden cancer of the lung or some other internal organ, Dr. Martin M. Fisher of New York and Drs. Lew A. Hochberg and Nathan D. Wilensky of Brooklyn, N. Y., report in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (Nov. 24).

They report four cases of lung cancer in men, three of whom were suspected of having thromboangiitis obliterans, also called Buerger's disease, and all of whom had more than one attack of thrombophlebitis.

Science News Letter, December 1, 1951

TECHNOLOGY

Aluminum Bulb Bases Save Critical Copper

► **ALUMINUM** IS being used in the bases of incandescent electric light bulbs instead of brass, thus saving critical copper for defense purposes, it was announced by General Electric's Lamp Department. In the future either metal can be used, depending upon which may be in least critical supply.

The lamps with aluminum bases are identical in life, efficiency and cost to the familiar brass-based bulbs. In addition they have the advantage of being resistant to tarnishing, and of maintaining a general better appearance. Aluminum also has excellent electrical properties, being two and a half times as good a conductor of electricity as brass.

Pure aluminum is not used in the new bulb bases. Instead it is a special alloy that will withstand the high temperatures used by machines on which lamps are assembled. To manufacture them a special solder and flux had to be developed which were suitable for use in a high-speed automatic operation.

Science News Letter, December 1, 1951



"LIGHT" BULBS—Lamp bulbs have become "light" with the introduction of aluminum to replace brass made with scarce copper for their bases.

GEOLOGY

Hot Rock Makes Strange Circles in Arctic Canada

► SEVERAL PECULIAR circular forms, looking like meteor craters in reverse or rocky boils on the skin of Mother Earth have been discovered on two Canadian islands in the Arctic Ocean.

One on Melville Island is four to four and a half miles in diameter and rises 739 feet above the surrounding flat country. There is another, about eight miles to the east, almost exactly like the first circular form.

Two smaller circular forms and two much larger elliptical forms were found on Ellef Ringnes Island, about 200 miles to the northeast of Melville. All of the forms were discovered in Royal Canadian Air Force photos.

Geologist I. C. Brown of the Canadian Geographical Survey believes that the large, elliptical forms on Ellef Ringnes Island were formed by hot volcanic rock which could not reach the surface. It could have spread out under the surface, pushing it upward to shape the forms.

The circular forms, he believes, are ring dikes. A dike, to a geologist, is a mass of volcano-formed rock intruded into a fissure of older rock.

Mr. Brown emphasized in the *AMERICAN JOURNAL OF SCIENCE* (Nov.) that the forms had been studied only from photographs and not at first hand.

Science News Letter, December 1, 1951

PUBLIC HEALTH

What to Do About Acne Problems

► SINCE ACNE is about as common as measles, you have doubtless heard of dozens of remedies, home treatments and diets for it. You may have tried some and found them worthless.

Advice to stop worrying about it because it will be outgrown is hard for most young people to follow. And if the acne is severe, it may put a scar on the personality as well as the skin.

There are some things that can be done to get rid of this trying skin trouble, and one of the first of these should be to see a doctor. If the acne is very bad, the family doctor may refer the young patient to a doctor who specializes in treatment of skin diseases. One of the reasons for seeing the doctor is that no two persons and no two cases of acne are exactly alike. The diet that helps one may not help another.

Second reason for seeing a doctor about the acne is that emotional stresses and tensions play a part in causing the acne or making it worse. Acne hits young people just as they are facing many new experiences in school, on a first job, and when they are starting to "date." Along with the

new experiences come many new feelings and emotional drives. Handling all this causes worry and tension. The young acne patient may find it easier to discuss his problems with his doctor than with his parents, especially since resentment toward his parents may be one of his problems.

Parents and the young acne sufferer will find much useful information and advice in a book, "The Skin Problem Facing Young Men and Women," by Dr. Herbert Lawrence, a dermatologist, or skin specialist, of San Francisco.

Science News Letter, December 1, 1951

TECHNOLOGY

Pressure System Makes Blast Furnaces More Effective

► AMERICAN IRON blast furnaces could produce an additional 1,000,000 tons of pig iron each year if converted to a new method of operation involving air pressure, it was stated by Dr. B. S. Old of Arthur D. Little, Inc., in Cambridge, Mass. This engineering firm originated the process.

In operating a furnace under this pressure method, the exit-gas system is throttled so that pressures are built up at the top of the furnace. They are built up to about 12 pounds above the normal atmospheric pressure now used. With the system throttled down, the air blown in the bottom of the furnace moves more slowly, so that it is possible to blow a greater weight of compressed air through without blowing valuable ore out of the furnace. The availability of more air permits the burning of more coke per day and thus the smelting of more iron per day.

The first pressure furnace started regular operation in 1946, Dr. Old reports. Eight are now in operation in the United States and one in England. All six of the large blast furnaces under construction in America will operate under pressure, and five old furnaces are now being converted to pressure. Operating cost per ton of iron is reduced by the pressure system, it is claimed, because of the increased output and more efficient use of coke.

Science News Letter, December 1, 1951

INVENTION

Patent Parachute For Slow Descent

► A PARACHUTE for soldiers designed to reduce the speed of descent as a landing is approached brought patent 2,575,387 to Helmuth and Theobald Kluglein of Valley Stream, N. Y. There are two sets of shroud lines to carry the user. One set is attached to the outer edge of the parachute canopy, the other to a smaller section surrounding the center of the canopy. Means are provided so that the user can shift his weight from one set to the other.

Science News Letter, December 1, 1951

IN SCIENCE

TECHNOLOGY

Nitrogen Grabbed from Air For Agriculture's Benefit

► NITROGEN GRABBED from the air by a new, thermal process developed at the University of Wisconsin will benefit American agriculture and will help to build up our supply of the element for manufacturing explosives and propellants.

A pilot plant for the Wisconsin process as the method is known, is now producing a ton of 60% nitric acid per day in San Jose, Calif., and another plant will be constructed at Sunflower, Kans. The method uses only air, water and energy for raw materials.

The air is milked of its nitrogen in a high-temperature, specially-constructed furnace to make nitrogen oxides, then the minute amounts of nitrogen oxide formed are recovered and concentrated. Water added to nitrogen dioxide will give nitric acid, vitally needed in the manufacture of explosives and propellants.

The thermal process was developed with the cooperation of the Wisconsin Alumni Research Foundation. Finding a material that would stand up under the furnace temperatures was a major problem in developing the process but a pure magnesium oxide was made to fill the bill.

Science News Letter, December 1, 1951

GENERAL SCIENCE

Rancher's Gift to Make Arid Regions More Fruitful

► WITH THE ultimate aim of making the world's arid regions more productive, the University of California at Berkeley has announced the establishment of the M. Theodore Kearney Foundation of Soil Science in its College of Agriculture.

The foundation will be devoted to the advancement of knowledge of soil science, including soil-water-plant relations, through basic physical, chemical, biological and hydrological research, with particular reference to arid and semi-arid farming regions.

The new foundation will be endowed with the proceeds of the bequest of Mr. Kearney, prominent rancher in central California in the latter part of the last century, who died in 1906, leaving to the University his estate which included the famous Kearney Vineyard in Fresno County. The endowment now amounts to \$2,268,000.

One third of the total land area of the world is arid or semi-arid. Less is known about the soils in these regions than about those in the more humid areas.

Science News Letter, December 1, 1951

SCIENCE FIELDS

TECHNOLOGY

New Process Extracts Titanium More Easily

► A NEW process for the extraction of titanium and zirconium from their ores more economically and in larger quantity than heretofore is claimed by Arthur J. Kerbeczek, Jr., a Ph.D. candidate at Columbia University.

Prof. Herbert H. Kellogg of Columbia's Engineering School plans to present the achievement to the government in the hope that it will make possible the use of titanium on a large scale in ships, weapons, jet airplanes and other war material.

The process is an electrolytic method for reducing the chloride, which is prepared from the oxide of the ore. Details are kept secret.

Mr. Kerbeczek worked for three years on the process following suggestions from Dr. Colin G. Fink, inventor of the commercial method of chromium plating.

Titanium is the ninth most abundant element in the earth's crust, and it is light in weight, with high melting point and high resistance to corrosion.

The new process is expected to be useful also for the extraction of zirconium, a metal somewhat similar to titanium, that the Atomic Energy Commission desires in large quantity.

Science News Letter, December 1, 1951

TECHNOLOGY

Viscose Rayon Brewing Bags Ease Coffee-making Job

► COFFEE BAGS, larger but similar to the tiny tea bags used on the dining table, are now possible with the use of snow-white, inexpensive, woven viscose rayon fabric which is unaffected by the coffee and adds no flavor or odor to the beverage.

These bags are for use by coffee packers and will come in packages from the grocer. They will come in four-cup, six-cup and ten-cup sizes. They are designed particularly for use in the familiar vacuum type coffee brewer but can be thrown into the old-fashioned pot in which boiled coffee is made, or can be used in the percolator if a special splash plate is put over the percolator basket.

When used in a vacuum coffee maker a "hold-down" to keep the bag in position is necessary. In the all-glass type a small perforated metal disk with an elongated pin projecting downward does the job. The pin is punched through the center of the bag and attached to a spring-chain that hangs down the neck.

Science News Letter, December 1, 1951

One appeal these coffee bags will have for the housewife is the lack of "mess" that will come from their use. They are "throw-away" bags after once used. The viscose rayon material holds all the solids of the coffee inside. Only soluble extracts get out. When the coffee is brewed, the bag and the messy grounds inside it are dropped in the trash can.

The discovery that viscose rayon can be used to make a successful coffee bag was by Earle F. Hiscock of Washington, and patents are pending. The bagged coffee will be known as Kip. A company has been formed which is now ready to furnish coffee roasters with bags and advice.

Science News Letter, December 1, 1951

CHEMISTRY

Chemical Wipes Out All Living Plants

► IF FUTURE wars should justify an attack on the enemy's crops, a new chemical might be scattered over fields to make them useless.

This chemical wipes out all living plants and keeps ground free from vegetation.

The first use of this CMU chemical will be along railroad tracks, in lumber yards, gasoline storage and other areas that need to be kept free of burnable materials.

Developed by Du Pont's research scientists, H. C. Bucha and Dr. C. W. Todd, the new herbicide is chemically 3-(p-chlorophenyl)-1,1-dimethylurea, hence its short name of CMU. It is safe to use, as it is not corrosive and only very slightly toxic to man and animals. It acts through the roots of the plants. About 20 to 100 pounds are used per acre. (See SCIENCE NEWS LETTER, Nov. 17, p. 311).

It is particularly effective on grassy weeds, but it does not have a selective action like 2,4-D which attacks the non-grasses and kills many other plants. It is a total killer. Borax has been used for a similar purpose but larger concentrations are needed.

Science News Letter, December 1, 1951

INVENTION

Machine Sews Carpet Strips on the Floor

► STRIPS OF carpet on the floor are sewed together with a machine, electrically-operated but pushed along the floor with a long handle. It has a shallow base which passes under the carpet, raising the edges so that they can be joined by fastening devices mounted wholly within the base. Inventors are Merwin F. Ashley, Arlington, and Edward W. Fearing, Quincy, Mass. United Shoe Machinery Corporation, Flemington, N. J., has acquired the patent rights to this carpet-sewing machine.

Science News Letter, December 1, 1951

CHEMISTRY

Vitamin-Like Factor Speeds Alcohol Production

► DISCOVERY OF a fermentation factor that speeds production of alcohol from sugar was announced by Drs. Bernard Wolnak and Carl S. Miner, Jr., of the Miner Laboratories, Chicago.

The fermentation factor is like a vitamin but is not any of the known vitamins. Drs. Wolnak and Miner said in their report to the American Chemical Society meeting in Chicago.

It is found in dried, activated sludge, a by-product of sewage purification systems, which hitherto has been used only as a fertilizer.

Science News Letter, December 1, 1951

TECHNOLOGY

Magnesium Protection for Underground Metal

► A COMPLETE system of buried bars of magnesium, to prevent the underground corrosion of structural steel, steel piping and electric lead-sheathed cables, will be installed at the new Fairless Works of United States Steel Corporation in Morrisville, Pa.

These bars of magnesium will provide what scientists call cathodic protection, a widely used method of setting up electric currents to offset the natural currents that cause underground corrosion of metals.

Such corrosion is of common occurrence and does much damage each year by causing the failure of underground cables and piping and weakening steel construction that extends down into the earth.

When dissimilar metals are in electrical contact and are placed in a conductive liquid or in the moist earth a natural current is generated between them and flows from one to the other. This current flows from the metal which by its nature corrodes most to the one that corrodes least. It causes the less stable metal to disintegrate or decay. The action is electrolytic, similar to that in the electroplating process.

Much scientific work has been carried out to find the most effective means of providing cathodic protection. It has been found that magnesium is effective in setting up a current from itself to lead, copper and steel. For that reason the magnesium bars will be used at the Fairless Works. All copper and lead placed underground will be coated with a neoprene jacket.

From time to time it will be necessary to replace the magnesium bars as they are eaten by the currents they set up. Before magnesium was decided upon, engineers of U. S. Steel made extensive test of this metal in samples of water and soil from the site of the plant.

Science News Letter, December 1, 1951

ASTRONOMY

Earth Bombarded Daily

Gigantic craters splashed out of the earth's surface by celestial bombs, hurtling at us from outer space. Most meteors burn, but some crash through.

By ANN EWING

► **GIGANTIC CRATERS** all over the world have been gouged by meteorites smashing into the earth's surface. More destructive than anything yet conceived by man, including the still theoretical fusion H-bomb, are the celestial "bombs" hurtling at us from outer space.

Meteors are small, astronomical bodies that flash across the sky. When these masses reach earth from outer space, they are called meteorites. Although about a million meteors flash into our atmosphere every day, only a very small number reach the ground.

Most of them are burned up high in the atmosphere, making beautiful displays of silent celestial fireworks—shooting stars. The most spectacular features of meteorites are the mammoth upheavals formed when massive ones crash into the earth.

It is now believed that most of this great mass of meteoric material disintegrates at the moment of impact, leaving only gaping scars in the earth's surface to show former existence. But it was once thought that the meteorite mass could be found buried deep in the ground under the crater site, a valuable, extra-terrestrial source of metals.

Over 100 meteorite craters, scattered at random over the world, have so far been identified. They range in size from more than two miles across down to small ones less than 30 feet across. There may be other large craters not yet identified, and there may well be many more small ones, whose "fingerprints" have been lost through the action of wind, rain and storm.

Since the study of meteorites gives us a clue to the make-up of the universe and to the relative distribution of elements, scientists eagerly examine the celestial fragments, whether they are found near the craters or in isolated spots.

The largest crater yet found, and definitely believed to have been caused by a meteorite, is the Chubb crater, located in the far northern corner of Quebec. If the massive missile had landed about 50 miles farther north, it would have made a spectacular splash in Hudson Bay, to be lost forever.

The meteor, however, crashed into the barren land of northern Canada, pushing up ripples in the granite rock as far as two miles from the crater's rim.

The 11,000-foot wide crater was spotted when F. W. Chubb, a Canadian prospector,

noted a round lake on some aerial photographs he was studying. He called this unusual geological feature to the attention of Dr. Victor Ben Meen, director of the Royal Ontario Museum of Geology and Mineralogy.

In July, 1950, they explored the crater and this summer a larger, better equipped expedition spent three weeks exploring the site. Though no fragments of meteoric material were picked up at the site, magnetic instruments did detect an anomaly, indicating the presence of a huge chunk of iron—not normally found in those barren, granite lands. The surface of the crater's lake is 500 feet below the rim's top level.

Recognized 50 Years Ago

It was only a little over 50 years ago that people realized there is such a thing as a meteorite crater. This knowledge came from the study of Canyon Diablo, or Meteor Crater, at the outermost fringes of Arizona's Painted Desert.

Carved out in prehistoric times, this crater was first thought to be unique. Then, when other craters were discovered, it was

thought to be biggest—and it was the largest known, until the discovery of the Chubb crater in Canada. Arizona's crater, however, still has one claim to uniqueness. It is easily accessible compared to the others.

The crater is approximately round, averaging about 4,000 feet in diameter and 570 feet in depth. Several thousand pieces of meteoritic iron, one of which weighs 1,014 pounds, have been found on the surrounding plain.

In western Australia is found the Wolf Creek Crater, observed from an aircraft in June 1947. From the air it looked like a huge bomb crater and was thought to be of meteoric origin. Only a few fragments, however, have been found in the vicinity. The crater is 150 feet deep, and 2,800 feet in diameter at the bottom of the hole.

The second meteorite crater to be discovered and identified as such is also in the United States. Located in Texas, it is known as the Odessa Crater. About 560 feet in diameter, it is quite large.

It is also quite ancient, for the crater itself is largely filled, its present depth being only about 15 feet. This crater and another smaller one of about the same age later found near it are the most weather-worn, and therefore probably the oldest, of all the craters yet found.

Near Henbury, in the center of Australia, a group of 13 meteor craters was



CHUBB CRATER—Dr. Victor Ben Meen (left), leader of the National Geographic Society-Royal Ontario Museum expedition, and Dr. I. W. Jones, chief of the Geological Surveys Branch of the Quebec Department of Mines stand on the rim of the two-mile-wide lake-filled scar of Chubb Crater.

discovered in 1931. Of these craters, 12 are roughly circular while the 13th and largest crater is oval. It is the only crater in the world of an elliptical shape so far definitely identified as of meteoritic origin. Scientists believe that it may have been caused by the simultaneous impact of two large bodies a short distance apart.

In the Rub'al Khali desert of Arabia are the Wabar Craters, their claim to distinction being that they were made in desert sand. Two separate craters have been mapped, with indications of two others, perhaps more, buried in the sand. In the shifting desert, it is difficult to tell how old these large depressions in the sand are. But they are evidently fairly recent, else they would have been long since obliterated.

Dumping Spots for Stones

Although discovery of meteoritic impact craters is quite recent, and many of them are in places not easily accessible without modern transportation, man has been living and cultivating fields among a group of them since "time immemorial." On the Baltic Island of Oesel, six of them were investigated and identified in the 1920's, although they were first described in 1827. More craters than the six now identified may belong to the group—these are the holes that have been considered by the nearby farmers as convenient dumping places for stones turned up when tilling their fields.

Twice in this century Siberia has been the scene of a meteoric fall—two "bombings" that would have resulted in more destruction than atomic bombs if the targets had been cities instead of relatively deserted areas.

On June 30, 1908, a great meteor swarm blazed over central Siberia and tore into the earth, destroying a large forest area. This was the first time that the formation of sizable meteor craters had been observed, although unfortunately no investigation of the fall was made until 1921.

Place of the fall was spotted from the devastated forests. Pine trees were felled

with their tops pointing away from center for a distance of 37 miles. Several thousand square acres were laid waste.

The center of the fallen forest is near the southern limit of permanently frozen ground. In the muddy swamp are numerous round depressions—varying reports place their numbers from 10 to 200.

Second Siberian Meteorite

A few hundred miles from the port of Vladivostok is the Siberian village of Novopokrova. There on the morning of Feb. 12, 1947, a school teacher with admirable presence of mind noted down the time of a brilliant flash in the sky: "10h35m."

Searchers for this blazing meteorite found a series of more than 100 holes, in the Sikhotaalin Mountains, some of them 30 to 400 feet deep and as wide as 75 feet. These holes were scattered over a one-square-mile area that has been intensely studied by Russian scientists.

They believe that the "rain of iron" resulted from the breaking up of a large single mass within the earth's atmosphere. Before it broke into millions of pieces it is believed to have weighed a thousand tons and to have had a diameter of about 30 feet.

Shock Wave Devastation

After this mass broke up, each piece rushed through the air at a speed many times that of sound, carrying in front of it a shock wave of compressed air that did not have time to move aside from the projectile. It was these shock waves that produced the extensive devastation.

One queer geological feature in the United States, never yet satisfactorily explained, is the Carolina "Bays." They lie in the coastal region of Georgia, North and South Carolina, Virginia and Maryland—hundreds of shallow, elliptical depressions, many of them filled with peat bogs. Approximately half of them are more than a quarter of a mile long, and over 100 of them exceed a mile in length.

Although they are of generally oval shape, measurements have shown that the shape varies with the size, the larger being the more elliptical. These giant marks in the earth's surface have their long axes in nearly the same direction—northwest and southeast.

The Bays were formed at least 10,000 years ago, perhaps as long as 50,000 years ago. Although a few geologists attribute them to a shower of meteorites, the consensus is that they have an entirely different origin.

Science News Letter, December 1, 1951

Chipmunks retire to winter quarters earlier each fall than most hibernating animals but they awake from time to time to eat the food they stored in their burrows.

DENTISTRY

Four Ways to Ward Off Toothaches

► RESEARCHERS are struggling to find an easy way to prevent tooth decay with its consequent toll of aching and lost teeth. They hope to find a tasteless, decay-fighting chemical that could be put into food, as iodine is put into salt to prevent goiter. But until they find the right chemical, they advise the following four ways of reducing tooth decay:

1. Reduction of carbohydrate consumption, especially sugar. Evidence indicates that decay is started by acids resulting from the action of bacteria on carbohydrate foods in the mouth.

2. Removal of carbohydrates from the mouth by tooth brushing immediately after each meal. The decay activity takes place within 20 to 30 minutes after eating.

3. Strengthening the resistance of enamel to decay by the use of fluorides. This could be done by applying the fluoride to the tooth surface in the dental office or as a community activity by adding it to the drinking water. This has been undertaken in many communities as a public health measure by adding an optimal amount of fluoride—1.0 part per million—to the drinking water.

4. Use of urea, ammonia, chlorophyll or penicillin to augment the mouth's natural bacteria-fighting ability. Anti-bacterial substances are being thoroughly investigated in many research studies today in the hope of learning their effectiveness in the control of dental decay.

These methods were discussed on the University of Illinois' telephone refresher course for dentists.

Science News Letter, December 1, 1951

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PUBLIC HEALTH

Happy Home Makes For Fewer Accidents

► ACCIDENTS ARE the leading cause of death among children from one to 15 years of age, killing some 10,000 in this age group each year.

A good many thousand more children are permanently disabled through accidental injuries. Preventing such accidents to children depends on many factors. An important one, which many parents may not know about, is the atmosphere of the home.

Medical scientists have been learning in recent years that a person's feelings have a lot to do with accidents. You have probably read about accident-prone workers and accident-prone drivers and how this proneness to get involved in accidents is related to the person's feeling unhappy or frustrated or resentful.

Such feelings lead some to get into accidents deliberately, while others are so engulfed in their feelings that they do not pay enough attention to what they are doing.

Children have feelings, just as grown-ups do. A child's unhappiness or lack of self-confidence may be the underlying cause of a series of what seem to be simple accidents or mishaps.

Parents should make sure their children are free from undue worry or tension, advise safety experts of the Metropolitan Life Insurance Company. If a child seems to be getting more than his share of cuts and burns and scrapes, the reason should be sought. The family doctor or pediatrician can give you advice on the causes of frequent accidents. It may be awkwardness from poor muscle coordination or a physical handicap. Training can be given to overcome that. But if the cause is a state of tension, the remedy lies in changing the atmosphere of the home.

A happy home where parents and children love and respect one another should be a safe home and one in which children will grow up with confidence that will help them to go through life safely.

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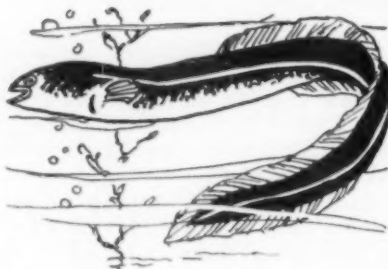
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An Astonishing Wanderer

► THE MOST unlikely-looking creatures sometimes astonish us with feats of which we would imagine them to be the last in the world to be capable.

Who would think, for example, that the dachshund, that mildest and most comical looking of dogs, was bred originally as a fighter, to follow the badger into his den and assail him in his own citadel?

And who would think of the long, slippery, lazy, sluggish eel, reposing slothfully in the mud, as one of the world's champion travelers?

Yet so it is. The eels in both European and American waters have swum many

thousands of miles and braved many dangers of the deep to come to the snug berths from which they are at last hooked or pronged to make a Friday feast.

Completely contrary to the famous trip of the salmon, which crowds the rivers and creeks in spring with fish eager to spawn, the hejira of the eel is toward the sea. Mature eels go down to the sea in vast numbers. All the eels from western Europe congregate in the southern part of the North Atlantic, produce their eggs and die.

The young eels—elvers, they are called—find their way back home without guides, and re-stock the waters. Our own North American eels make a similar migration, their breeding ground being somewhat to the north of that of their European brethren.

The young eels do not look at all eel-like when they are hatched, nor for many a moon thereafter. They are flat, thin, almost transparent things, about the size and shape of a penknife blade. These weird little fish slowly make the long return journey, and no one has yet figured out exactly how they do this unguided. At last they reach the ancestral fresh-waters, and settle down into the mud of their forefathers.

It is rather a pity that we Americans have not cultivated more of a taste for eel, for it is really very good eating. Our cousins "in the Old Country" appreciate it better. In some parts of Europe, smoked eel is in high favor, and anybody who has ever tried it will tell you that smoked eel is just about all that could be desired in the way of hors d'oeuvres.

Science News Letter, December 1, 1951

TECHNOLOGY

Recover Manganese Ore

► AMERICA'S ABILITY to produce manganese commercially from its own plentiful low-grade ore is a step forward with the development of a process which uses nitric acid as a reduction agent but in which most of the acid is recovered for reuse.

While manganese has many uses, the most important one is in steel making. Nothing else has been found that can take its place. For every ton of steel produced, 13 pounds of manganese are used. About 90% of the manganese ore now used in this country is imported from countries where high-grade ore is found.

Russia was once the principal source but in these Iron Curtain days most of the ore is coming from India and Africa. American consumption in the steel industry is about 1,500,000 tons a year of ore which averages 48% manganese.

The new process is called the Nossen Nitric Acid Cycle because it was developed by E. S. Nossen Laboratories, Inc., of Paterson, N. J. It is described by Ernest S. Nossen in INDUSTRIAL AND ENGINEERING CHEM-

ISTRY (July), a publication of the American Chemical Society whose headquarters are in Washington. Several methods have been developed to reduce America's manganese ore, which is mostly all low-grade, but most of them are too costly for commercial applications.

As described by Mr. Nossen, the process is applicable to carbonate and oxide ores and to several types of silicate ores. It permits the separation of manganese from iron, silica and other impurities, and produces a 60% concentration of manganese.

The process starts with grinding the ore to a fine size, then treating it in a reducing atmosphere. The greater part of the manganese goes to manganous oxide, and the iron oxide is reduced to ferrosiferrous oxide. Nitric acid is used to leach out the manganese which becomes manganous nitrate. In the presence of air at a temperature of 200 degrees Centigrade, the manganous nitrate becomes manganese oxide and nitric acid.

Science News Letter, December 1, 1951

GENERAL SCIENCE

How to Tell the Crank

► WHEN A widely known scientist or a newspaper editor receives a letter containing a revolutionary new scientific hypothesis, he can now apply a questionnaire which will decide whether he has received a "crank" letter.

Dr. Laurence J. Lafleur, associate professor of philosophy at Florida State University, writing in *SCIENTIFIC MONTHLY* (Nov.), issued by the American Association for the Advancement of Science, explains that such so-called crank letters come from all sorts of people, some extremely ignorant, but a few with good academic backgrounds.

The questions which may be asked of revolutionary hypotheses in order to determine whether the proposer is a crank or a scientist are listed by Dr. Lafleur:

1. Is the proposer of the hypothesis aware of the theory he proposes to supersede?
2. Is the new hypothesis in accord with currently held theories in the field of the hypothesis, or, if not, is there adequate reason for making the changes, reasons of weight at least equal to the weight of the evidence for the existing theories?
3. Is the new hypothesis in accord with the currently held theories in other fields? If not, is the proposer aware that he is

challenging an established body of knowledge, and does he have sufficient evidence to make such a challenge reasonable?

4. In every case where the new hypothesis is in contradiction with an established theory, does the hypothesis include or imply a suitable substitute?

5. Does the new hypothesis fit in with existing theories in all fields, or with substitutes proposed for them, to form a world view of an adequacy equivalent to that of the currently accepted one?

6. If the new hypothesis is at variance with theories capable of prediction or of mathematical accuracy, is the new theory itself capable of such prediction or mathematical accuracy?

7. Does the proposer show a disposition to accept minority opinions, to quote individual opinions opposed to current views, and to overemphasize the admitted fallibility of science?

These questions were part of a discussion by Dr. Lafleur of the recent controversy in which there were put forth in a magazine article and book the idea of comets colliding, the earth standing still and other similar happenings that scientists rejected.

Science News Letter, December 1, 1951

METALLURGY

Determine Life of Metals

► THE PROBABLE life of steel alloys, other metals and plastics in moving parts of machines can now be determined in greatly decreased time by a new process based on precise measurements of samples under controlled heat. The process was developed at Rensselaer Polytechnic Institute, Troy, N. Y., by Dr. Joseph L. Rosenholtz and Prof. Dudley T. Smith.

Apparatus for carrying out the determinations has also been developed by the two scientists. It makes possible the completion in 10 hours or less of a testing job which has been requiring three months or longer

on costly machines under expert supervision, they state.

The discovery is important to many industries because of the constant search for materials to meet new and demanding standards. Thousands of tests are made annually to determine if a new material will permit faster and cheaper production satisfactorily. This new method makes possible the rapid and inexpensive testing of materials for tank engines and jet motors, as well as for propellers, turbine blades, revolving shafts and many other machine parts.

These Rensselaer scientists discovered that identical samples of rods of steel or other material, when heated under exact controls to the same temperature, possess rates of expansion in length which vary with the amount of stress to which each test piece has been previously subjected. They have devised an apparatus which measures such expansion to an extremely sensitive degree.

The process uses eight small test pieces two inches long and two-tenths of an inch in diameter. These bars are subjected to stresses in a definite range. They are then put through an equal number of cycles of vibration so that they will be on an equal level of fatigue.

The samples are then put in the special apparatus and subjected to controlled tem-

peratures from room temperature up to that of boiling water. The apparatus automatically magnifies and records the linear expansion of each specimen 3,500 times. The endurance limit of each specimen is determined by plotting the linear expansion against the stresses previously applied.

Science News Letter, December 1, 1951

INVENTION

Phone Bills to Be Figured Automatically by Machine

► YOUR TELEPHONE bill will come to you practically untouched by human hand as the result of complicated automatic and electronic accounting devices which received patents recently.

One of the patents is for a transcribing and summarizing system for gathering together all the items on a subscriber's bill and summarizing them. The patent is pictured in 74 separate drawings of the various electrical circuits and their relation.

Another patent describes equipment which will automatically figure out the amount of tax on your phone bill as well as the charge. Information is fed into the equipment from a keyboard and the equipment does the rest.

The third patent is for an automatic accounting machine which collects the data on bills from various and scattered sources in the records, calculates the charges to be made and translates the records into the form required for printing.

Patents 2,572,132, 2,572,699 and 2,572,804 were awarded scientists and engineers of the Bell Telephone Laboratories New York, and assigned by them to Bell. They are: Henry A. Giroud, New York, Gordon C. Irwin, Fair Haven, N. J., Lindley A. Kille, Morristown, N. J., John B. Retallack, New York, George Riggs, Port Washington, N. Y., Walter B. Strickler, East Orange, N. J.; Warren W. Carpenter, Forest Hills, N. Y.; Edward Vroom, Ossining, N. Y.; Erlon W. Flint, Mountain View, N. J., and Amos E. Joel, Jr., New York.

Science News Letter, December 1, 1951

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Books of the Week

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AIRCRAFT U. S. A.—Harriet E. Huntington—*Doubleday*, 52 p., illus., \$2.50. Photographs and spotter silhouettes illustrate the descriptions of 49 military planes.

THE ALPHABET: A Key to the History of Mankind—David Diringer—*Philosophical Library*, rev. ed., 607 p., illus., \$12.00. This is the story of the origins and development of systems of writing, which, by giving permanence to knowledge, make civilization possible.

BACTERIAL PHYSIOLOGY—C. H. Werkman and P. W. Wilson, Eds.—*Academic Press*, 707 p., illus., \$8.50. This advanced text for students and research workers includes a section on the significance of bacterial physiology in general biology and a selective bibliography.

A DICTIONARY OF ANTIBIOSIS—Leonard Karel and Elizabeth Spencer Roach—*Columbia University Press*, 373 p., \$8.50. Listing alphabetically the antibiotic substances, plants from which they are derived, and test organisms, together with technical data on each; a bibliography is included.

FIRST ANNUAL REPORT: 1950-1951—*The National Association for Mental Health*—23 p., paper, free upon request to publisher, 1790 Broadway, New York 19, N. Y. There has been impressive progress in psychiatric services, research, education, and community organization since the Association was formed last year through the cooperation of three formerly separate organizations.

HANDBOOK: Emergency Defense Activities, Oct. 1951-Mar. 1952—General Services Administration—*Govt. Printing Office*, 119 p., paper, 30 cents. This is the latest revision of the citizen's guide to Federal organizations for defense.

INTERSPECIFIC AND INTERGENERIC GRAFTS, WITH SPECIAL REFERENCE TO FORMATION OF RUBBER IN GUAYULE—Carl A. Taylor, H. M. Benedict, M. N. Walker, and Ernst Artswager—*Govt. Printing Office*, USDA Technical Bulletin No. 1040, 38 p., illus., paper, 15 cents. Reporting research on the

very early grafting of rubber-bearing and non-rubber-bearing plants, in order to increase yield and throw light on the problem of how photosynthetic products are translated into rubber.

LIFE HISTORIES OF NORTH AMERICAN WILD FOWL (ORDER ANSERES): Ducks, Geese and Swans—Arthur Cleveland Bent—*Dover*, two volumes, 666 p., illus., \$8.00. Based on the author's own observations and research and that of his correspondents all over North America, illustrated with many photographs, this book will be valuable both to naturalists and to nature-lovers.

MODERN WAYS IN ONE- AND TWO-TEACHER SCHOOLS—Effie G. Bathurst and Jane Franseth—*Govt. Printing Office*, Office of Education Bulletin 1951, No. 18, 48 p., illus., paper, 20 cents. Teachers, administrators, and perhaps parents too, will find helpful this discussion of how the 93,000 such schools in our country can turn special problems into assets.

MONTE CARLO METHOD—National Bureau of Standards—*Govt. Printing Office*, NBS Applied Mathematics Series 12, 42 p., illus., paper, 30 cents. The method involves interesting combination of sampling theory and numerical analysis. This symposium exchanged information concerning applications of the method.

MUDDY WATERS: The Army Engineers and the Nation's Rivers—Arthur Maass—*Harvard University Press*, 306 p., illus., \$4.75. Mr. Maass, who is "intensely interested" in bringing about a change in the Army's natural resources programs, here gives his criteria for administrative responsibility and examines in their light the development of rivers by the Corps of Engineers.

OIL AND GAS DEVELOPMENT IN KANSAS DURING 1950—W. A. Ver Wiebe and others—*State Geological Survey*, Bulletin 92, 187 p., illus., paper, 25 cents. In 1950 Kansas produced more natural gas and more natural gas liquids than ever before.

PHILOSOPHICAL PROBLEMS OF MATHEMATICS—Bruno Baron v. Freytag gen. Loringhoff, translated from the German by Amethe Countess von Zeppelin—*Philosophical Library*, 88 p., \$2.75. Some aspects of the relation between mathematics and intellect.

PSYCHOPATHOLOGY OF EVERYDAY LIFE—Sigmund Freud—*New Am. Lib.*, Authorized English Edition, 168 p., 35 cents. In this, his most popular work, Freud applies his analytic theory of personality to incidents in "normal" life and shows how indistinct is the borderline between serious emotional disturbance and normality. Originally published by Macmillan.

SOCIAL POLICY AND SOCIAL RESEARCH IN HOUSING—Robert K. Merton, Patricia Salter West, Marie Jahoda and Hanan C. Selvin, Eds.—*Association Press*, 187 p., paper, \$1.75. Social scientists and architects combine forces to

design housing best suited to good living in this special issue of the Journal of Social Issues.

SPINOZA DICTIONARY—Dagobert D. Runes, Ed.—*Philosophical Library*, 309 p., \$5.00. Albert Einstein's foreword says: "In alphabetical order one will find definitions, propositions and explanations in Spinoza's own words which interpret essential issues in a manner comparatively easy to comprehend, avoiding forbidding formalism."

A STUDY OF THE DISPOSAL OF CHEMICAL WASTE AT SEA: Report of the Committee for Investigation of Waste Disposal—Alfred C. Redfield and Lionel A. Walford—*National Research Council*, publication 201, 49 p., illus., paper, \$1.00. The results of an investigation begun for the National Lead Company, who met serious opposition when they began dumping commercial waste off the New Jersey coast.

TRAFFIC SURVEYS BY POST CARDS—*Highway Research Board*, Bulletin No. 41, 30 p., illus., paper, 45 cents. By sending post card questionnaires to registered vehicle owners, information about traffic movements within, through, into and out of an area may be obtained at a saving in time and cost over older methods, several states have found.

Science News Letter, December 1, 1951

TECHNOLOGY

New Cooling System Adds Efficiency to Generators

► SMALLER ELECTRIC generators will do the work of larger ones with a newly-developed system for cooling the giant machines now used to produce electric power for homes and factories. Important is the claim that turbine generators with this cooling system will reduce by 50% the copper required for such units, thus resulting in a great saving of this critical metal.

The cooling system is a development of Westinghouse Electric Corporation. It is called a "hollow coil" technique, and it is applicable to turbine generators having a rating of 90,000 kilowatts or more. It is a result of studies made in the fundamental problem of heat resulting from power generation. This heat arising in the generator's copper coils, if completely unchecked, would expand the metal, ultimately wrecking the unit, it was explained by C. M. Laffoon of the Westinghouse staff.

In the cooling system, he stated, instead of passing the cooling agent, hydrogen, over the solid insulated coils, the coils are made hollow and the hydrogen passes through the coils themselves. This places the hydrogen in direct contact with the naked copper. The hydrogen picks up the heat, carries it off for disposal, then recirculates through the coils.

The first hollow-coil, internally-cooled generator is now under construction and will go on test during 1952. Other units will be ready later.

Science News Letter, December 1, 1951

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TECHNOLOGY

Photograph Body's Interior

See Front Cover

► A CAMERA especially designed for doctors and dentists to photograph interior parts of the body cavities, such as ear, nose, mouth and throat, has been perfected at the U. S. Air Force School of Aviation Medicine, Randolph Field, Tex.

Small and compact, it is known as an endoscopic or internal camera. It was invented by Capt. Harry R. White, research photographer at the school.

Some of the standard instruments found in a doctor's office for looking into body cavities can be attached to the camera as accessories. By funneling light through these instruments, interior parts of the anatomy are illuminated and photographed through a small, adjustable lens. Black and white, color, and infra-red pictures can be made.

Operating at speeds from time exposure down to one-thousandth of a second, the unique camera can record both plus and

minus magnification on standard 35 mm. film by use of an adaptor lens. Its shutter and film moving mechanism were extracted from a 35 mm. standard type camera, thus eliminating some research problems and expense of making the parts. Shown on the cover of this week's SCIENCE NEWS LETTER is the exterior portion of an eye photographed with this inside-body camera.

Housed in an aluminum case, the camera is equipped with a safety glass light port. This permits the free flow of light and at the same time shields the patient from possible injury in case of flash bulb explosion.

An attachment lens to the camera—the only one of its kind in existence—permits a wide variation of focal length, while an adjustable arm, or extension, places the lens within inches of the area to be photographed. By use of a standard inspection mirror, found in every doctor's office, the back side of teeth can be photographed as readily as the exterior portions.

Science News Letter, December 1, 1951

GEOPHYSICS

Marble Cake Structure

► THE EARTH'S crust under the continents is more like a marble cake than a layer cake.

This conclusion is reported by Dr. M. A. Tuve of the Carnegie Institution of Washington to the American Philosophical Society after a study of more than 250 shots, each using one ton or more of explosives, which were provided by the Navy and mines and quarries.

He and his colleagues challenge the prevalent idea that the deep rocks under the top sediment of continents are divided into fairly even, regular layers. About 2,000 observations were made to examine structures down to 40 miles depth.

When only a few observations of an explosion were used, the records were deceptively like those from earthquakes. When

they used many of the explosive shots in their calculations, however, and compared values found at different stations, they discovered that the shock waves did not travel in layers as previously pictured by earthquake investigators. Instead, there was an interference effect, caused by the "marble cake" structure of the interior.

Records at fixed locations from a few shots or a few earthquakes would mislead anybody into thinking the interference pulses came from distinct buried layers, but this picture was disproved by moving the shots and using portable seismic equipment.

Physicists learn about the deep structure of the earth by studying and comparing earthquake records. Dr. Tuve and his colleagues believe that their recent investigations have shown that the layer cake structure is much too simple a picture of the rock pattern deeply buried under continents as a remainder of bygone epochs of mountain buildings.

Science News Letter, December 1, 1951

GENERAL SCIENCE

Planetarium Built in USA To Be Installed in Uruguay

► URUGUAY IS to have the first large planetarium in South America. It will be located in Montevideo, at the new Science Museum being established there.

The planetarium, elaborate instrument for projecting stars and other celestial

bodies upon a large dome, is being built in the United States by Spitz Laboratories, Inc., Philadelphia. It will be the first large planetarium made and shipped from any foreign country except Germany.

"Our large planetarium," stated Armand N. Spitz, president of Spitz Laboratories, "has been designed to equal or exceed the performance of instruments such as are in use in Philadelphia, New York, Chicago, Pittsburgh, Los Angeles and Chapel Hill, N. C."

The basic principles of this instrument differ in many respects from those of the German Zeiss planetarium, Mr. Spitz reports. Designed especially for increased effectiveness of illusion and ease of operation and maintenance, Mr. Spitz reports that the initial cost of his design is half the pre-war price of the Zeiss.

Until four years ago, when Mr. Spitz introduced a portable planetarium, the Zeiss Optical Works of Jena, Germany, was the only commercial manufacturer of planetaria.

Science News Letter, December 1, 1951

TECHNOLOGY

Ocean-Sounding Device Accurate in Deepest Water

► OCEAN SOUNDING becomes more accurate with an improved type of echosounding equipment which will give accurate readings of depths down to 6,000 fathoms, or 36,000 feet. The new equipment is a product of Edo Corporation, College Point, L. I., N. Y., and was developed for the U. S. Navy.

Echo-sounding involves the use of sound waves emitted underwater from the hull of a vessel which travel to the bottom of the ocean and are reflected back. Special equipment to send out powerful sound waves and pick up the echoes is required. Depth is determined by the interval of time required by the wave to reach the bottom of the ocean and return.

The echo-sounding apparatus consists of two units, a transducer which transmits and receives signals from the bottom of the ship, and the main electronic unit located on the bridge or in the navigating room.

Science News Letter, December 1, 1951

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Science News Letter, December 1, 1951

❁ **BRAILLER**, a typewriter for the blind, features a compact, portable aluminum case and comfortable plastic keys and embodies a new operating mechanism. The only moving part is the Braille unit which carries a small embossing head across the page. Paper emerges over a flat plate.

Science News Letter, December 1, 1951

❁ **PORTABLE SEWING** machine, held in one hand in use, is designed particularly for closing the tops of heavy cotton, burlap or paper bags after they are filled with a product. Electrically-operated on any 110-volt line, action is controlled by a switch under the thumb of the user.

Science News Letter, December 1, 1951

❁ **ELECTRIC EYE**, trained on small graphite crucibles used for fusing together small electronic tube parts, regulates temperatures up to 3,500 degrees Fahrenheit. It detects minute changes in color and intensity at high temperatures, sending an electric impulse to cut the heating current at the proper moment.

Science News Letter, December 1, 1951

Do You Know?

Gila monsters of New Mexico and Arizona are the only poisonous lizards in the United States.

Soybeans now widely grown in America produce 20% more beans containing 10% more oil than those of 25 years ago.

Popcorn is a warm-season crop; it grows best in the warmer parts of the United States.

Krypton, a rare gas used in television tubes, is obtained from the atmosphere although some 10,000,000 cubic feet of air are required to yield one cubic foot of this gas.

South American chinchilla, one of the most valuable fur animals in the world, is now being experimentally but successfully bred in Norway.



❁ **HEADREST SPECTACLE**, which distributes its weight over the entire head of the factory worker rather than on nose alone, is shown in the photograph. It has a broad band to fit around the head and

forehead to which the spectacle legs are pivoted over the ears. Spectacles are easily swung to the top of the head.

Science News Letter, December 1, 1951

❁ **METAL DETECTOR**, in use in a candy manufacturing plant to detect metal particles that might be in the product, is a magnetic device through which the candy passes on a conveyor belt. A metal particle upsets the magnetic field causing the belt to halt.

Science News Letter, December 1, 1951

❁ **RUBBER BOOTS** for men of the armed services, now being shipped to Korea, are wool-insulated to prevent frostbite in zero weather. The boot consists of two layers of rubber with two plies of knitted wool between them. Nylon film on the inside prevents friction inside them.

Science News Letter, December 1, 1951

❁ **COUNTER TUBE**, for use in Geiger counters to detect radioactive isotopes, has a fusion-sealed mica end window supplied in various thicknesses. Tubes have an extremely small overall size, and are said to be efficient and to cost less than half the price of others.

Science News Letter, December 1, 1951

CHEMISTRY for Christmas

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